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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	SMITH	Examiner:	unknown
Serial No.:	10/750578	Group Art Unit:	3653
Filed:	December 29, 2003	Docket No.:	13353.0020US01
Title:	CLEARANCE OF COIN JAMS IN COIN VALIDATORS		

CERTIFICATE UNDER 37 CFR 1.10:
"Express Mail" mailing label number: EV 372673490 US
Date of Deposit: June 10, 2004

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By: Teresa Anderson
Name: TERESA ANDERSON

SUBMISSION OF PRIORITY DOCUMENT(S)

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Assistant Commissioner for Patents
Alexandria, VA 22313-1450

Dear Sir:

Applicants enclose herewith one certified copy of an Australian application, Serial No. 2003900099, filed January 3, 2003, the right of priority of which is claimed under 35 U.S.C. § 119.

Respectfully submitted,

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Dated: June 10, 2004

By _____
Brian H. Batzli
Reg. No. 32,960

BHB:nel

Patent Office
Canberra

I, JULIE BILLINGSLEY, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2003900099 for a patent by MICROSYSTEM CONTROLS PTY LTD as filed on 03 January 2003.

WITNESS my hand this
Fourteenth day of January 2004

J. Billingsley

JULIE BILLINGSLEY
TEAM LEADER EXAMINATION
SUPPORT AND SALES

2

P/00/009
Regulation 9.2

AUSTRALIA

Patents Act 1990

PROVISIONAL SPECIFICATION

Invention Title: **Clearance of coin jams in coin validators**

The invention is described in the following statement:

Clearance of coin jams in coin validators

Field of the Invention

This invention relates in general to the clearance of coin jams in coin validators, and is concerned in particular respective aspects with jam clearance in the detector and return regions of the coin path.

When employed herein, the term "coin" denotes both official currency coins and coin-like elements in general having a nominal value for releasing or otherwise operating prescribed equipment into which the element may be inserted. Such elements include tokens and the like.

Background of the Invention

A common configuration of coin validator includes a coin input slot, an inclined rail extending from the input slot past one or usually a pair of detect coils, a reverse incline to a coin return or coin rejection opening, and a gate between the detect coils and the return/rejection opening that is responsive to a coin accept/reject decision to pass each coin either to the return/rejection opening or to a retention or sort region. These constructions typically have a hinged side door over the upper part of the coin path that is actuable to be pivoted open for releasing coin jams.

In a variation of the hinged jam-clearance door, cover segments over the upper and intermediate regions of the coin path are actuable to widen their coin path regions by parallel outward movement. These segments are linked to a pivotally mounted cover segment that is actuated to be hinged out and to thereby move the other cover segments and widen the associated coin path regions.

In a typical installation, the validator is hidden behind a faceplate and retained within an outer protective housing. Although the hinged door can be wholly opened by a site manager who has full access to the validator, access for the typical user inserting coins in the validator is normally restricted to activation of a push-button or the like in the faceplate, which is effective to only partially hinge open the door. Opening of the door in this way widens the coin path to a limited extent, especially nearer the hinge axis.

By such means, these configurations do allow users to clear jams in some instances, but it is a matter of practical experience in the field that the known hinged mechanisms are not capable of user-activated clearance of a significant proportion of coin jams.

In most if not all cases, the hinged door or cover segment mounts one coil of the opposed pair of detect coils and is held closed by a spring bias mechanism. The other coil is held in the main housing or chassis of the validator. This arrangement renders the validators susceptible to variation of the width of the coin path air gap between the detect coils through slackness in the spring bias mechanism or by manipulation of the door position by a user with fraudulent intent. As the response characteristics employed to distinguish coins of different denominations passing through the air gap are typically dependent on the exact width of the air gap between the detect coils, the result of a variation in the width of the air gap can be a false coin identification.

It is an object of the invention to at least address one or both of these problems.

Summary of the Invention

A first aspect of the invention essentially proposes that, in order to facilitate clearance of coin jams in the coin path, part of the structure defining the coin path is actuable to move so as to widen the coin path including a region of the path that extends upstream from the coin return opening and is downstream of the gate.

The invention provides, in its first aspect, a coin validator including:

a coin insertion opening;

a coin return opening;

structure defining a coin path from the coin insertion opening to the coin return opening, which coin path includes a return region thereof that extends upstream from said coin return opening;

means to detect and identify an object in a detection region of said coin path; and

gate means in said coin path between such detection region and said return region responsive to identification of said object to either divert said object from said coin path or constrain it to traverse the path to said coin return opening;

wherein part of said structure is actuable to move so as to widen said coin path including said return region, whereby to facilitate clearance of jams in said coin path.

In a second aspect, the problem of coin path air gap variation is addressed by including means to latch at least the actuable part of said structure in the detection region to hold fixed the width of the coin path air gap in the detection region.

The invention therefore provides, in its second aspect, a coin validator including:

a coin insertion opening;

a coin return opening;

structure defining a coin path from the coin insertion opening to the coin return opening;

means to detect and identify an object in a detection region of said coin path, which means includes a pair of spaced opposed detect coils and an air gap in said coin path between said detect coils; and

gate means in said coin path responsive to identification of said object to either divert said object from said coin path or constrain it to traverse the path to said coin return opening;

wherein part of said structure is actuable to move so as to widen at least a portion of said coin path including said air gap, whereby to facilitate clearance of jams in said coin path;

and further including means, selectively releasable by a person who has inserted one or more coins into said coin insertion opening, to latch at least said actuable part of said structure in said detection region to hold substantially fixed the width of said air gap in said detection region.

Preferably, said structure includes a housing defining one side of the coin path and a cover means eg a door defining the other side of the coin path, and this cover means constitutes said part of said structure that is actable to move. Said detect coils are then respectively mounted in said housing and in said cover means.

Preferably said part of said structure is such that, on its movement to widen the coin path, the whole of said path opens to form a chamber in which a coin at any location in the coin path above said return region can drop to said return region. To this end, the moveable part of the structure advantageously includes a rail defining the floor of an upper part of the coin path past said detection means.

Preferably, said moveable part of the structure remains substantially parallel to an opposed part of the structure, eg the housing, as it moves to widen the coin path. This arrangement may be achieved by fixing the moveable part of the structure, e.g. the door, by mounting means including two or more parallel slots and co-operating pins. Most preferably there are four slot/pin pairs.

Preferably, said moveable part of said structure is mounted whereby movement of said part includes a first segment of movement in which said latching means is engaged and a second segment of movement in which said latching means is released. For example, said slots may be formed as bent slots including slot portions oriented to accurately define the air gap width at the detection means.

Said first segment of movement is advantageously such that the detection means is disabled before the latching means is released.

Brief description of the drawings

The invention will be further described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a coin validator according to an embodiment of the invention, incorporating both aspects of the invention;

Figure 2 is a partially cut-away view corresponding to Figure 1; and

Figure 3 is a cross-section on the line 3-3 in Figure 1, depicting both principal conditions of the moveable jam clearance door.

Preferred embodiments

The illustrated coin validator 10 comprises a chassis or main housing 12 and an overlying door 20. The opposed faces of housing 12 and door 20 are shaped to define a

coin path 30 between these faces. Housing 12 includes end plates 16, 17 of similar external profile that embrace door 20 between them and moreover mount the door for movement in a manner to be described in due course. Coin path 30 extends from a coin insertion opening 40 in the upper part of end plate 16 to a wider coin return opening 45 in the lower part of end plate 16.

In a typical installation, the validator would be mounted behind a faceplate (not shown) that overlies end-plate 16 and has slots in register with openings 40,45. The validator would be associated with other coin-handling or coin-activated equipment that would be operable in response to the passage of a validated coin by the validator.

Coin path 30 includes an upper inclined segment 32 with a floor 50 defined by a coin rail 52 along which each coin rolls from coin insertion opening 40 through a coin detection region 54. Detection region 54 is defined by a pair of opposed detect coils 55 that are respectively mounted in housing 12 and door 20. Rail 52 is provided integrally on rear wall 21 of door 20, and the portion of coin path 30 between the coils comprises an air gap 57 (Figure 3) to which further reference will be made subsequently.

At the lower end of rail 52, a gate 56, responsive to a coin accept/reject decision by controller circuitry in housing 12, either opens to allow the coin to drop into a coin accept path 34 behind wall 18 (as shown for coin 5a in Figure 3), or stays closed to deflect the coin into an inclined return segment 36 of the coin path 30 (as shown for coin 5b in Figure 3). This return path segment 36 includes a rail 58 integral with front wall 18 of housing 12, along which the coin rolls to coin return opening 45. Rail 58 defines a coin return region 59.

Door 20 is supported in end-plates 16, 17 by a four point pin-and-slot mounting. Two of the slots 60a, 60b are in the top front corners of each end plate 16, 17, while the other two 60c, 60d are at the mid fronts of the end-plates, just above coin return opening 45 in the case of end-plate 16. Complementary pins 65 on the end walls of door 20 snugly and slidably engage the respective slots 60.

Each slot 60 is a bent slot with two straight portions 62 (the jam clearance option), 63 (the locking portion). Jam clearance portion 62 extends forwardly and

upwardly. Locking portion 63 is aligned so as to be at or close to right angles with the air gap. When pin 65 is in locking portion 63, the door is latched to hold the width of the air gap 57 between detect coils 55 substantially fixed. The door is biased to this latched condition by spring loading of the release mechanism to be further discussed shortly.

If door 20 is lifted parallel to locking portions 63 of slots 60, it initially traverses a first vertical segment of movement comprising a distance predetermined by the length of slot portions 63, thereby maintaining the width of air gap 57 until the lock disengages. As the door commences movement in slot portions 63, an optical beam coin-edge detector in the detection region 54 decouples, disabling the coin detection function. Further upward movement of the door 20 causes the pins 65 to traverse a second segment of movement along slot portions 62, thereby moving the door outwardly. This upward movement of door 20 may be activated by a user by pushing a button on the faceplate (not shown) that in turn engages and pivots a lever 75 against a spring (not shown). Pivoting movement of lever 75 about an intermediate pivot mount is effective to lift the door via a pin at the inner end of the lever that engages with the door. Pivoting downwardly of the outer or free end of the lever raises the pin at the inner end and lifts the door.

In the event of a coin jam, a user may operate lever 75 fully to lift door 20 through its two step motion from the normal position shown by broken lines 20' in Figure 3 to the full lines position 20. This movement widens the whole of coin path 30 and in particular widens the coin path 30 in coin return region 59. Moreover, because upper coin rail 52 is integral with the rear wall 21 of door 20, the movement of door 20 separates rail 52 from the front wall 18 of housing 12, and thereby opens up the coin path into a single chamber 80 in which coins in the upper inclined segment of path 30 (such as coin 5c in Figure 3) can fall vertically onto lower rail 58 of the coin return region 59. These results of the door movement facilitate clearance of most jam conditions in the coin path, and delivery of the released coins through coin return opening 45.

The lower end of rear wall 21 of door 20 has an outstanding transversely inclined step 72 that complements and seats under rail 58 in the closed condition of the door but sits adjacent and flush with the outer edge of rail 58 in the raised condition (as clearly

seen in Figure 3), whereby coins are guided across onto rail 58 and thereby downwardly towards coin return opening 45.

It will be appreciated that the motion of door 20 is effective to widen the whole of the coin path including in particular the coin return region 59, and that there are no pinch points or barely widened regions arising from hinging action as in prior validators. Because of the initial segment of movement of pins 65 in portions 63 of slots 60, there is a positive latching of the width of air gap 57 between coils 55, and it is not possible for a user with fraudulent intent to lever the door to slightly vary the width of air gap 57 and thereby change the reading obtained by the validator for each coin as it passes through the air gap. In this way, the validator may misread the denomination or value of an inserted coin, to the benefit of the user.

For a site manager who has full access to the validator, door 20 may be released and fully opened, e.g. to clear a jam not released by activation of lever 75, by disengaging the lower pair of pins 65 from the upper end of their slots 60c, 60d along grooves 69, and then rotating the door upwardly about the upper pair of pins 65 still engaged in slots 60a, 60b. The door may be closed by the converse of this action.

It will be understood that the invention disclosed and defined herein extends to all alternative combinations of two or more of the individual features mentioned or evident from the text or drawings. All of these different combinations constitute various alternative aspects of the invention.

Microsystem Controls Pty Ltd

by Freehills Carter Smith Beadle

Registered Patent Attorneys for the Applicant

3 January 2003

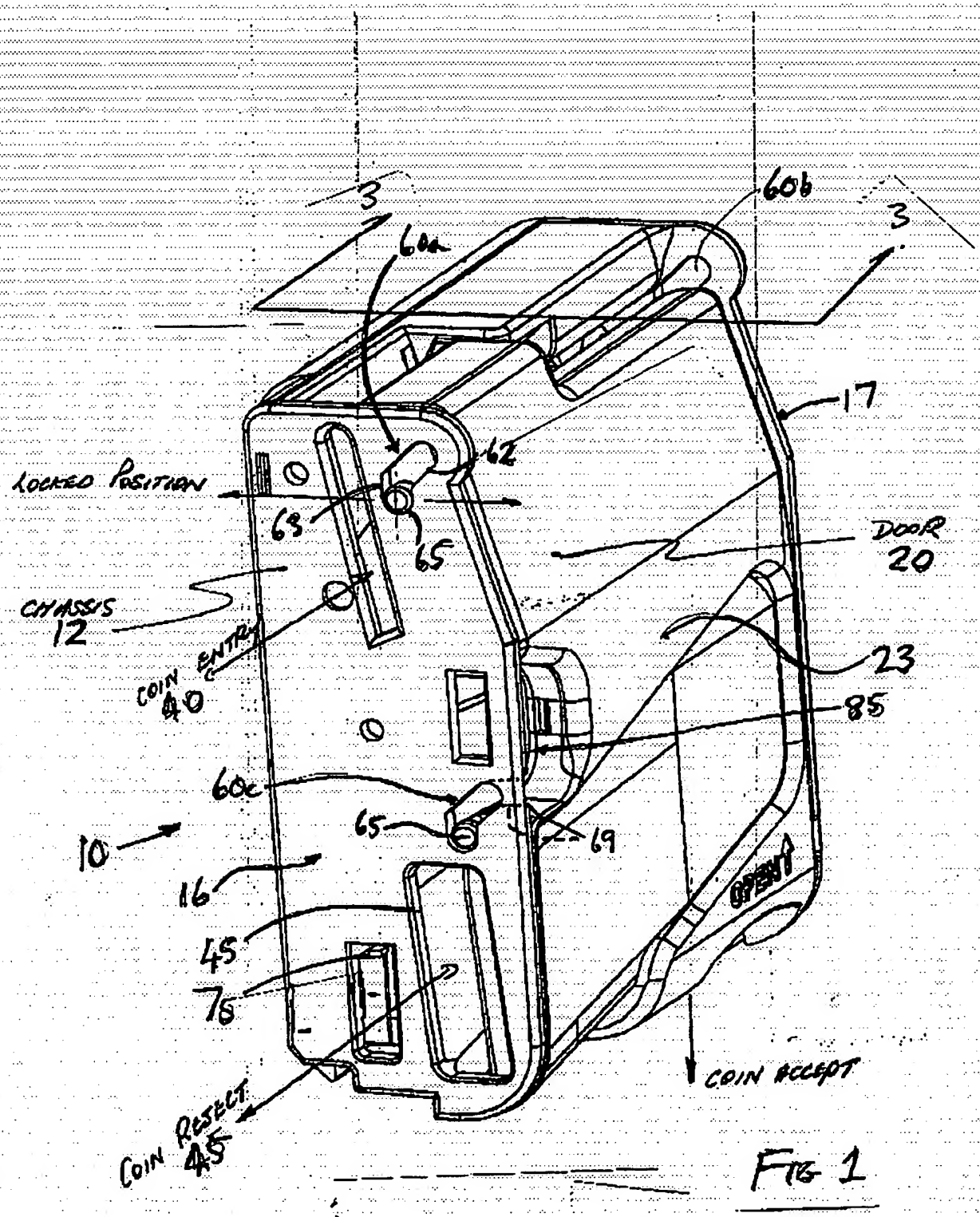
3
60b
3
60a
17
62
LOCKED POSITION
63
65
DOOR
20
CHASSIS
12
COIN ENTRY
40
23
85
60c
65
69
10
16
45
78
OPEN
COIN REJECT
45
COIN ACCEPT

FIG 1

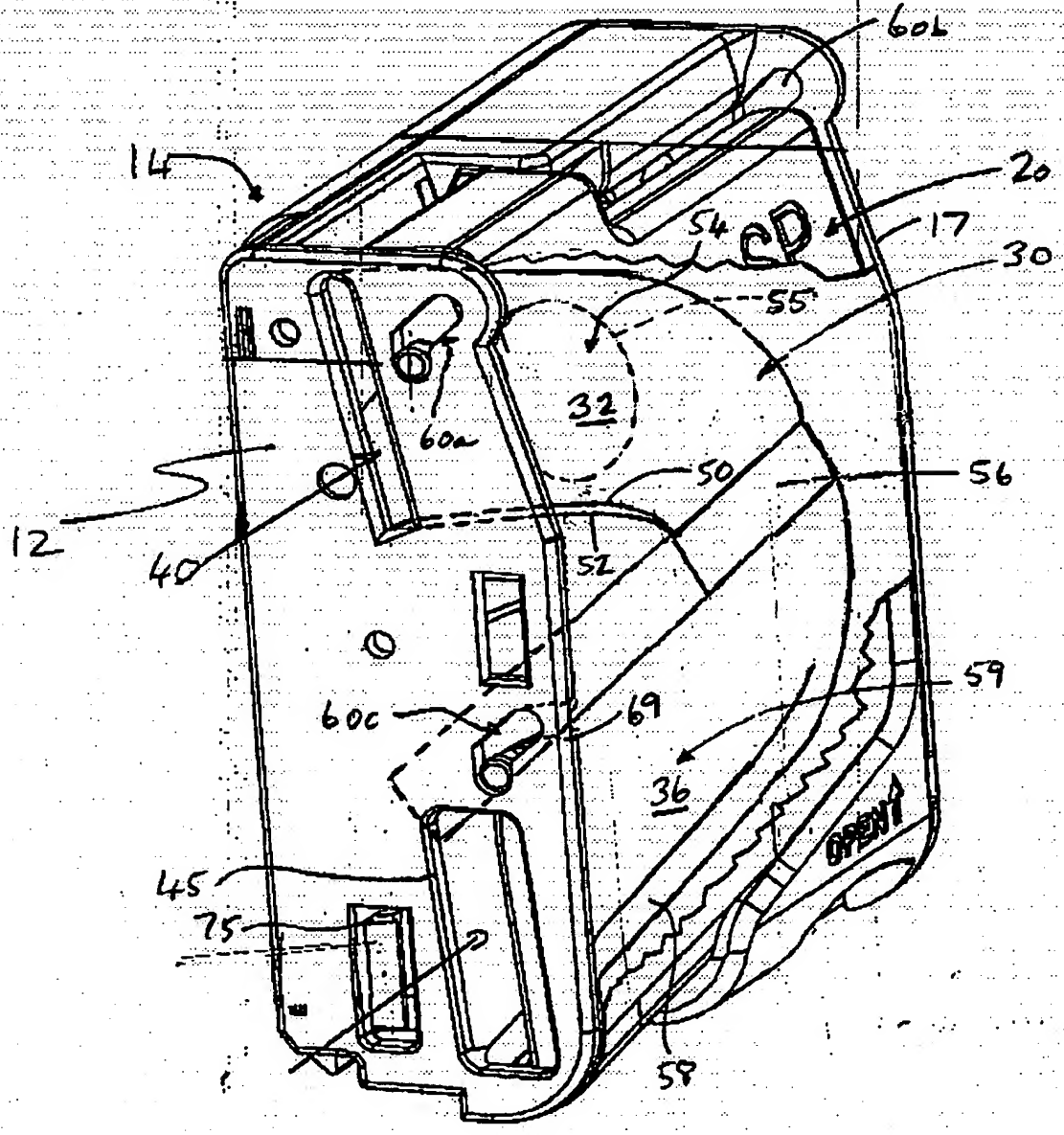

FIG 2

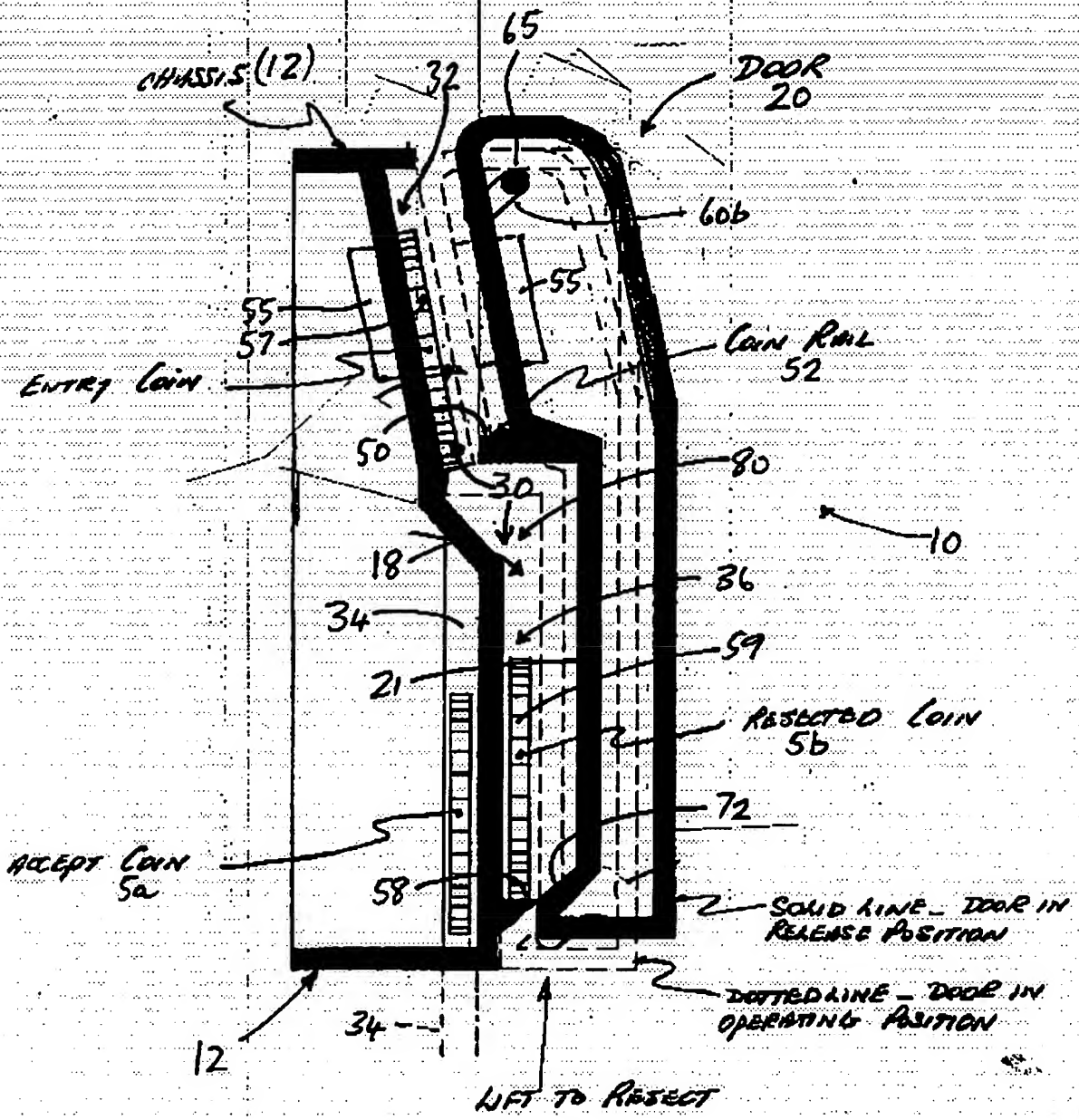
65
CHASSIS (12)
32
DOOR 20
60b
55
55
57
ENTRY COIN
COIN RAIL 52
50
80
30
10
18
36
34
59
21
REJECTED COIN 5b
72
ACCEPT COIN 5a
58
SOLID LINE - DOOR IN RELEASE POSITION
DOTTED LINE - DOOR IN OPERATING POSITION
34
12
LIFT TO REJECT

FIG 3